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Boll Weevil Control with Emphasis on Early-Season and Fall Treatment in 1960, 1961, and 1962 at Tallulah, La.

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Results of research conducted in Texas, Louisiana, and Mississippi on treating cotton with an insecticide during the fall to reduce or eliminate overwintering boll weevils (Anthonomus grandis Boheman) indicated that lower seasonal populations might make this method more effective and that a combination of treatments might result in eradication. To evaluate this approach to control, community-wide experiments with early-season, late-season, and fall treatments were conducted near Tallulah, La., in 1960, 1961, and 1962. Results of these experiments are given in this report.

All infestation records were made by Tallulah laboratory personnel. Materials for the early-season and fall treatments were furnished by several insecticide companies. The National Cotton Council made some funds available for conducting the experiment in 1960. Early-season treatments were made with ground equipment, but most of the late-season and fall treatments were made with airplanes.

1960 Experiment

Three communities with some isolation—Hunter's Bend, Houston Ridge, and Quimby—received early-, late-season, and fall treatments for boll weevil control. Three similar communities receiving only late-season treatment were used as checks or untreated areas.

In the treated areas, Hunter's Bend, in the southern end of Madison Parish on the Tensas River, had 165 acres of cotton in 16 fields on 10 farms. The nearest cotton was grown about 3½ miles away. Houston Ridge, 4 miles south of Tallulah, had 64 acres in four fields on three farms. It is surrounded by timber. Other cotton was grown 2 miles away. Quimby, on Highway 65 in the southern end of Madison Parish, had 36 acres of cotton on one farm 2 miles from other cotton.

1/ Retired.

2/ Deceased.

In the untreated areas, Sharkey had a 6-acre field in the center of a large timbered area about 4 miles from Hunter's Bend and other cottonfields. Barnes had about 75 acres on several small farms in a timbered area along Highway 80 in east-central Madison Parish. Bear Lake had 60 acres on several small farms in a timbered area near Highway 80 in west-central Madison Parish.

In the treated areas, laboratory personnel applied insecticides to control thrips and overwintered boll weevils early in the season and to kill off boll weevils in the fall. Late-season treatments were made by individual farmers. In the untreated areas, late-season treatments likewise were made by farmers, but boll weevils were adequately controlled on very few farms.

Early-Season Treatments

Early-season treatments for overwintered boll weevil control were begun when plants began producing squares about the size of a pinhead and were continued at 5-day intervals until first bloom. Results are given in tables 1 and 2 for the boll weevil populations and the boll weevil and bollworm infestations.

All fields at Hunter's Bend received five spray applications of 2 pounds of toxaphene plus 1 pound of DDT plus 0.25 pound of methyl parathion per acre between June 3 and July 13. The overwintered weevil population averaged 128 per acre on June 9, and records at various intervals thereafter showed that good control was obtained. The infestation averaged 2-, 3-, and 8-percent punctured squares on July 16, 23, and 30, respectively. A bollworm (Heliothis zea (Boddie)) infestation developed, with square injury averaging 1 and 2 percent on July 23 and 30. Treatment for late-season bollworm-boll weevil control was begun between July 23 and 30 and continued for the remainder of the production period.

At Houston Ridge three spray applications of 0.25 pound of methyl parathion and two spray applications of 0.25 pound of methyl parathion plus 0.5 pound of DDT per acre were made between June 23 and July 12. The population averaged 44 per acre when treatment was begun; 5 days later it had been reduced to 19, and no weevils were found thereafter. The infestation averaged 1- and 2-percent punctured squares on July 23 and 30, respectively. Although the boll weevil infestation was very low, the bollworm infestation became severe enough to require treatment beginning on July 26. It was continued for the remainder of the season.

Table 1.—Overwintered boll weevil populations and infestations in early-season-treated and untreated communities, Tallulah, La., 1960

Community	Number of weevils per acre on June						Percent punctured squares on July					
	9	15	17	23	28	30	2	9	16	23	30	Average
Treated:												
Hunter's Bend	128	73	10	24	7	0	2	1	2	3	8	3.2
Houston Ridge	0	0	--	44	19	0	3	2	1	1	2	1.8
Quimby	0	0	--	13	50	--	--	3	0	0	0	.75
Untreated:												
Sharkey	0	0	--	25	0	--	--	--	14	17	33	21.3
Barnes	--	--	--	169	--	--	--	24	17	19	20	20.0
Bear Lake	--	--	--	--	--	--	--	--	17	25	37	26.3

Table 2.—Boll weevil and bollworm infestations, by weekly intervals, in early- and late-season-treated and untreated communities, Tallulah, La., 1960

Week ending—	Treated						Untreated				
	Hunter's Bend		Houston Ridge		Quimby		Sharkey		Barnes		Bear Lake
	Weevil-punctured squares	Bollworm-injured squares	Weevil-punctured squares	Bollworm-injured squares	Weevil-punctured squares	Bollworm-injured squares	Weevil-punctured squares	Bollworm-injured squares	Weevil-punctured squares	Bollworm-injured squares	Weevil-punctured squares
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
June 18	8	5	--	--	--	--	--	--	--	--	--
25	1	17	--	--	--	--	--	--	--	--	--
July 2	2	3	3	4	--	--	--	--	--	--	--
9	1	1	2	1	3	2	--	--	24	2	--
16	2	1	1	1	0	1	14	3	17	2	17
23	3	1	1	1	0	1	17	1	19	2	25
30	8	2	2	4	0	3	33	1	20	3	37
Aug. 6	9	2	1	3	3	5	28	2	22	4	29
12	14	2	2	2	2	6	12	0	--	--	--
20	21	2	5	5	2	3	9	2	57	4	71
27	20	3	5	4	5	2	50	2	64	2	68
Sept. 3	23	3	5	4	4	4	28	7	53	1	75
10	25	3	14	5	6	8	29	8	--	--	--
17	20	3	9	3	13	4	62	1	--	--	--
24	--	--	7	2	22	1	--	--	--	--	--
Oct. 1	29	2	7	1	11	1	--	--	--	--	--
8	26	4	11	1	10	1	--	--	--	--	--
Average	10	2	5	3	6	3	28	3	33	2	40

At Quimby four spray applications of Guthion (O,O-dimethyl S-(4-oxo-1, 2,3,-benzotriazin-3-(4H)-ylmethyl) phosphorodithioate)3/ at 0.25 pound per acre were made between June 29 and July 18. The population averaged 50 weevils per acre when treatment began. Although further populations were not recorded, the infestation averaged 3-percent punctured squares on July 9, and none were recorded during the last 3 weeks of July.

At Sharkey the overwintered weevil population averaged 25 per acre on June 23. Cotton had not been planted in the community the previous year. The infestation was considerably higher during July than in the treated communities, averaging 21.3-percent punctured squares.

At Barnes the overwintered weevil population averaged 169 per acre on June 23. The infestation during July averaged 20-percent punctured squares, which was considerably higher than in the treated communities.

Overwintered weevil populations were not determined at Bear Lake. However, the infestation averaged 26.3-percent punctured squares in July, which was considerably higher than in the treated communities.

Late-Season Treatments

In these communities about 2 weeks elapsed between the time that early treatment was discontinued and late treatment was begun. Injurious bollworm infestations made late-season control necessary at this time. An insecticide to control boll weevils was added to DDT to keep infestations at low levels. The cost of its inclusion was minor. Late-season control was inadequate at Barnes and Bear Lake.

In late-season treatments, the fields at Hunter's Bend received 7 to 12 applications for bollworm-boll weevil control between July 20 and September 13. Beginning treatment dates varied from July 20 to 30 in the various fields. Methyl parathion, methyl parathion plus DDT, and toxaphene plus DDT plus methyl parathion sprays, and toxaphene plus DDT and methyl parathion plus DDT dusts, were the most commonly used materials. Late-season insect control was satisfactory in this community. The boll weevil infestation was held below injurious levels, although the number of punctured squares gradually increased as the season advanced. Good bollworm control was maintained.

Fields at Houston Ridge received 11 applications of methyl parathion plus DDT dust or spray between July 25 and September 16. Good boll weevil and bollworm control was maintained.

At Quimby nine spray applications of 0.25 pound of Guthion plus 1.0 pound of DDT per acre were made between July 29 and September 16. The boll weevil infestation was held at low levels and bollworm damage was kept to a minimum, although infestation pressure was considerable during August and early September.

3/ Mention of a proprietary product in this report does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture and does not imply its approval by the Department to the exclusion of other products that may also be suitable.

In the three communities where the early-season control applications were not made, late-season applications were begun in mid-July. At Sharkey, where a fairly good schedule with calcium arsenate or methyl parathion plus DDT dust was maintained, the seasonal average boll weevil infestation was considerably higher than in the three communities where the early-season applications were made. Bollworm infestations were similar in all areas. At Barnes and Bear Lake, where irregular and rather ineffective late-season applications were made, the boll weevil infestation was severe throughout the season. The seasonal boll weevil infestation averaged 7-percent punctured squares in the treated communities and 33.7 percent in the untreated communities. The bollworm square injury averaged 2.7 and 2.5 percent, respectively.

Fall Treatments

Only Hunter's Bend and Houston Ridge received the full schedule of fall treatment with methyl parathion. These treatments were made at weekly intervals from the time the crop no longer needed protection from insects until killing frost occurred. Quimby received only two such applications, which were made by the farmer.

Weevil population records were determined from mid-September through October at Hunter's Bend and Houston Ridge. A few records were obtained at Quimby and Sharkey. Weevil samples were collected during the same period and were submitted to the Stoneville laboratory from Houston Ridge and to the Baton Rouge laboratory from Hunter's Bend for diapause determinations. For the remainder of these studies, diapause determinations were made at the Tallulah laboratory. Ground-trash examinations were made after frost in all five communities except Sharkey. Results are given in tables 3-5.

At Hunter's Bend four to six applications of methyl parathion at 0.5 pound per acre were made in the various fields between September 14 and October 28. Most fields received one to three applications of a defoliant during this period. In some instances, combination insecticide-defoliant applications were made. These treatments reduced the boll weevil population to fairly low levels. However, the incidence of diapause during treatment was fairly high, averaging 32.8 percent. Weevils found in ground trash after frost averaged 774 per acre as compared with 5,044 at Barnes and 10,028 at Bear Lake, where no fall treatments were made.

At Houston Ridge five applications of methyl parathion at 0.5 pound per acre were made between September 20 and October 25 for fall boll weevil control One application of a defoliant was also made. DDT at 1.0 pound per acre was included in the first three applications. These treatments reduced field populations to low levels. Diapause incidence averaged only 6.2 percent. No weevils were recovered from ground trash.

At Quimby only two applications of methyl parathion were made on October 3 and 10. Field populations were fairly high. Limited determinations indicated that diapause incidence averaged 36.8 percent. Ground-trash examinations showed an average of 1,452 weevils per acre, which was higher than at Hunter's Bend and Houston Ridge, but considerably less than at Barnes and Bear Lake.

Table 3.—Boll weevils per acre in fall-treated and untreated communities, Tallulah, La., 1960

Community	September			October				Oct. 31-Nov. 1	Average
	14-16	20-21	26-29	4-7	11-12	18-20	24-27		
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Treated:									
Hunter's Bend	2,020	822	608	1,281	769	1,873	1,842	175	1,174
Houston Ridge	--	383	308	200	267	283	634	50	304
Quimby-------	--	--	--	--	800	--	2,075	925	1,267
Untreated:									
Sharkey------	3,600	--	--	--	--	5,150	--	--	4,375

Table 4.—Reproducing, intermediate, and diapausing boll weevils in fall-treated communities, Tallulah, La., 1960

Community and date treated	Reproducing	Intermediate	Diapausing	Total	Diapausing
	Number	Number	Number	Number	Percent
Hunter's Bend:					
Sept. 15----------	45	2	1	48	2.1
21----------	110	44	73	227	32.1
27----------	106	12	23	141	16.3
Oct. 6----------	114	28	202	344	58.7
12----------	135	0	79	214	36.9
19----------	172	92	85	349	24.4
25----------	169	78	78	325	24.0
Average----------	121	37	77	235	32.8
Houston Ridge:					
Sept. 19----------	41	0	1	42	2.4
26----------	37	1	2	40	5.0
Oct. 3----------	18	3	0	21	0
10----------	33	0	0	33	0
17----------	27	0	3	30	10.0
24----------	40	7	4	51	8.0
31----------	0	0	5	5	100
Average----------	28	2	2	32	6.2

Table 5.—Boll weevils per acre in ground-trash examinations in fall-treated and untreated communities, Tallulah, La., 1960-61

Community	Fall 1960	Spring 1961	Survival
	Number	Number	Percent
Treated:			
Hunter's Bend----------	774	194	25.1
Houston Ridge----------	0	0	0
Quimby----------	1,452	0	0
Average----------	742	65	8.8
Untreated:			
Barnes----------	5,044	484	9.6
Bear Lake----------	10,028	2,097	20.9
Average----------	7,536	1,291	17.1

At Sharkey, which did not receive fall treatment, field populations were high. Records were not made at Barnes and Bear Lake. Limited determinations indicated a diapause incidence of 48 percent at Sharkey and 80 percent at Barnes.

Ground-trash examinations were not made at Sharkey after frost. High populations were found in ground trash at Barnes and Bear Lake, averaging 5,044 and 10,028 weevils per acre, respectively, as compared with the Madison Parish average of 6,860 and with the Hunter's Bend and Houston Ridge averages of 774 and 0. Ground-trash examinations in March also showed a marked reduction in surviving weevils in treated over untreated communities, averaging 65 and 1,291 weevils per acre, respectively, or almost 20 times as many in the untreated as in the treated communities.

In table 6 boll weevil populations in May and June 1961 were considerably lower in the communities treated the previous fall. No data are given for Barnes because cotton was planted late.

Table 6.—Boll weevils per acre in spring of 1961 in 1960 fall-treated and untreated communities, Tallulah, La.

Community	Week ending May		Week ending June				
	19	26	2	9	16	23	30
	Number	Number	Number	Number	Number	Number	Number
Treated:							
Hunter's Bend---	0	0	0	0	12	38	80
Houston Ridge---	0	8	0	6	0	19	0
Quimby----------	--	--	0	0	0	250	75
Average------	0	4	0	2	4	100	52
Untreated:							
Bear Lake-------	75	38	200	167	38	77	72
Sharkey---------				1/0	0	75	150
Average-------	75	38	200	84	19	76	111

1/ Treated with Guthion after June 9.

Experiments in 1961

Three boll weevil control programs were compared in 1961, as shown in table 7. In the first program, fields at Hunter's Bend and Houston Ridge received 1960 fall and 1961 late-season treatments. They were treated 10 times from July 12 through September with methyl parathion and with methyl parathion plus DDT at 5- and 7-day intervals. In the second program, fields at Quebec received only late-season treatment in 1961. Applications of methyl parathion plus DDT were made seven times between August 1 and September 20.

In the third program, fields at Bear Lake and Barnes received early-season plus late-season treatments in 1961. At Bear Lake, Guthion at 0.25 pound per acre was applied four times from June 7 to July 20 and Guthion plus DDT five times from August through September. At Barnes, Guthion at 0.35 pound per acre was applied four times from June 29 through July 12 and Guthion plus DDT five times from August 15 through September. In the untreated check at Barnes the cotton was inadequately treated.

The most effective program was the one used at Bear Lake and Barnes, where late-season treatment followed early-season treatment. The next most effective program was at Hunter's Bend and Houston Ridge, where treatment made the previous fall was followed by late-season treatment beginning in July. The least effective program was at Quebec, where only late-season treatment was used.

Table 7.—Comparative boll weevil infestations in 1961 in communities receiving various treatments in 1960 and 1961, Tallulah, La.

Treatment and community	Percent punctured squares week of—							
	July			August				September
	14	21	28	4	11	18	25	1
1960 fall plus 1961 late-season treatments:								
Hunter's Bend-----	16	16	7	12	13	11	11	12
Houston Ridge-----	8	4	3	12	15	9	9	12
Average---------	12	10	5	12	14	10	10	12
1961 late-season treatment:								
Quebec----------	36	33	35	38	51	48	53	40
1961 early-season plus late-season treatments:								
Bear Lake---------	1	1	2	2	4	6	4	4
Barnes----------	1	1	4	6	8	14	16	22
Average---------	1	1	3	4	6	10	10	13
Untreated:								
Barnes----------	36	42	28	32	56	45	58	65

Early-season treatments with Guthion at 0.25 pound per acre were applied four times at 5-day intervals from June 9 to July 12 at Barnes and four times at 7-day intervals from June 7 to July 14 at Bear Lake.

In late June overwintered boll weevil populations were considerably lower in the treated than in the untreated communities, as shown in table 8. The 5-day interval treatment at Barnes gave a better reduction of overwintered populations than the 7-day interval at Bear Lake from June 2 through June 23. However, on June 30 the results were reversed. The square infestation was very similar in both interval treatments, although it was slightly higher in the 5-day interval treatment at Barnes in late July and early August. The square infestation in both early-treated communities was much lower than in the untreated communities. Infestations were injurious in the latter area after July 14. Late-season treatment in the early-treated communities was not begun until August 15. The infestation averaged 10-percent punctured squares in both these communities when late-season treatment started. In the untreated communities, late-season treatment was begun on August 1 for Quebec, and treatment begun in July for Barnes was inadequate.

Table 8.—Overwintered boll weevil populations and infestations in early-treated and untreated communities, Tallulah, La., 1961

Community	Number of weevils per acre for week ending—					Percent punctured squares for week ending—				
	June					July			August	
	2	9	16	23	30	14	21	28	4	11
Treated:										
Barnes	--	0	7	33	118	1	1	4	6	8
Bear Lake	20	167	38	77	72	1	1	2	2	4
Average	--	84	22	55	85	1	1	3	4	6
Untreated:										
Quebec	--	0	12	169	177	36	33	35	38	51
Barnes	--	--	--	--	--	36	42	28	32	56
Average	--	--	--	--	--	36	38	32	35	54

Four small farms at Quebec were used in the fall-treatment program. The area is surrounded by timber. Methyl parathion at 0.5 pound per acre was applied on September 28 and October 10, 18, and 27, when a killing frost occurred. Two small farms beyond the timbered area were used as checks.

Both areas had some late-planted fields, which were fruiting heavily in late September and boll weevil populations were heavy. Just before fall treatments were begun, populations were slightly lower in the treated than in the untreated area, as shown in table 9. Also, 42 and 56 percent, respectively, of the weevils were in diapause, even though farmers had applied calcium arsenate or methyl parathion plus DDT dust until the determinations were made.

Boll weevil population counts were made just before each application and 1, 5, and 10 days after each application in several fields with high weevil populations. Ground-trash population records were made biweekly during the period and on November 29 after weevils had left the fields to hibernate.

As shown in table 9, 60 percent of the population consisted of diapausing populations 24 hours after applications. This compared with 42 percent before applications were begun and 32 and 34 percent 5 and 10 days after applications. The diapause percentage was almost constant on comparable dates in the untreated area. These results show that methyl parathion applications at 10-day intervals reduced the percentage of boll weevils in diapause to some extent, but a shorter interval would be necessary to obtain a good reduction or elimination of diapausing boll weevils.

Table 9.—Boll weevils per acre and diapause determinations in 8 fall-treated and 5 untreated fields in Quebec area, Tallulah, La., 1961

Date treated	Date inspected	Treated		Untreated	
		Total population	In diapause	Total population	In diapause
		Number	Percent	Number	Percent
Sept. 28	Sept. 21 1/	1,006	48	1,409	62
	Sept. 27 1/	1,266	42	1,930	56
	Sept. 29	2/325	54	----------	----------
Oct. 10	Oct. 11	3/850	54	----------	----------
18	Oct. 19	3/1,238	71	----------	----------
Average	----------	804	60	----------	----------
Sept. 28	Oct. 4	1,044	20	3,230	43
Oct. 10	Oct. 13	3/1,825	24	2/4,892	64
18	Oct. 23	3/731	53	2/4,558	57
Average	----------	1,200	32	4,227	54
Sept. 28	Oct. 9	3,338	24	5,080	62
Oct. 10	Oct. 18	2,897	28	5,029	57
18	Oct. 26	740	49	3,245	54
Average	----------	2,325	34	4,451	58
Oct. 27	Oct. 30	2/575	22	4/2,775	65

1/ Not included in average.
2/ 3 fields sampled.
3/ 4 fields sampled.
4/ 1 field sampled.

Populations were reduced 88, 83, and 67 percent 1 day after applications were made on September 28, October 10, and 18, as shown in table 10. Diapause populations were reduced 83, 82, and 46 percent, respectively. Low temperatures by October 18 probably reduced the effectiveness of methyl parathion on that date.

Comparative populations hibernating in surface-ground trash are given in table 11. On November 29 there were approximately five times as many weevils in hibernation in the untreated area as in the area treated with 0.5 pound of methyl parathion per acre on September 28 and October 10, 18, and 27. However, fall treatment did not eliminate these hibernating populations.

Table 10.—Reductions of boll weevil populations 24 hours after treatment with methyl parathion at 0.5 pound per acre, Tallulah, La., 1961

Weevils per acre--	When applications were made on—		
	Sept. 28	Oct. 10	Oct. 18
	Number	Number	Number
Before treatment--------	2,768	4,912	3,744
24 hours after treatment	325	850	1,238
Percent reduction--	88	83	67
In diapause before treatment----------	1,080	2,407	1,685
In diapause 24 hours after treatment-------	185	442	904
Percent reduction--	83	82	46

Table 11.—Boll weevils per acre in ground-trash examinations in fall-treated and untreated communities, Tallulah, La., 1961

Community	Sept. 21	Oct. 5	Oct. 20	Oct. 30	Nov. 29
	Number	Number	Number	Number	Number
Treated:					
Quebec -------	0	0	871	194	774
Untreated:					
Edgerton -----	0	0	1,936	1,936	3,872

Experiments in 1962

Spring ground-trash examinations and overwintered-population and square-infestation records were made in 1962 at Quebec and Edgerton. At Quebec, fields received fall treatment in 1961 plus early-season treatment in 1962. Edgerton received late-season treatment beginning on July 17, 1962. Results are shown in tables 12 and 13.

Weevil populations in ground trash in the untreated community were almost four times those of the treated community in the spring.

Overwintered boll weevil populations also were low on cotton in the spring in the treated community. Four spray applications of Guthion at 0.25 pound per acre were begun on June 12, when plants began producing pinhead size squares, and were completed by July 3. No punctured squares were found in the treated area on July 6. The infestation remained very low for 6 weeks after the early-season treatment period. Most of the crop was set during this time. Three weeks after the last early-season application an injurious bollworm infestation developed. Because the boll weevil infestation was low, two spray applications of DDT alone were made for bollworm control in the last week of July. Parathion at 0.125 pound per acre was included in the second application for cotton aphid (Aphis gossypii Glover) control. Three late-season applications were made for boll weevil-bollworm control between August 15-31. The bollworm was of major importance. Late-season treatment began in the untreated community on July 17 and continued throughout the remainder of the season.

Table 12.—Boll weevils per acre in ground-trash examinations in fall-treated and untreated communities, Tallulah, La., 1961-62

Community	Fall of 1961	Spring of 1962	Survival
	Number	Number	Percent
Treated:			
Quebec ----------	774	355	46
Untreated:			
Edgerton --------	3,872	1,291	33

Table 13.—Overwintered boll weevil populations and infestations in fall- and early-season-treated and untreated communities, Tallulah, La., 1962

Community	Number of weevils per acre for week ending—				Percent punctured squares for week ending—							
	June				June	July				August		
	8	15	22	29	29	6	13	20	27	3	10	17
Treated:												
Quebec----	25	30	17	0	0.3	0	0.4	0.8	0.4	0	2	16
Untreated:												
Edgerton----	---	75	75	100	---	16	20.0	19.0	7.0	13	11	4

Discussion

In 1960, control of overwintered weevils was good in all treated communities. However, better results were obtained at Houston Ridge and Quimby, where planting and treatment schedules were uniform. Variation in planting dates at Hunter's Bend resulted in varied treatment and in somewhat poorer weevil control. It was unfortunate that bollworm control measures became necessary so soon after the early-treatment period. Boll weevil control could have been delayed for additional weeks, especially at Houston Ridge and Quimby. In late-season treatments, somewhat better control of overwintered boll weevils was obtained at Houston Ridge and Quimby because of uniform planting and treatment schedules and because the same insecticides were used throughout both treatment periods. The use of various insecticides at Hunter's Bend probably accounted for less efficient control.

Early-season treatment followed by late-season and fall treatments reduced the number of weevils in hibernation in ground trash considerably over communities receiving only late-season and fall treatment. The population in ground trash in the spring in the untreated communities was almost 20 times that of the treated communities. This was also reflected in early summer in field populations, which were considerably lower in the treated communities.

In 1961, the most effective boll weevil control program was one where early-season plus late-season treatments were used. The next most effective program was where treatment was made the previous fall followed by late-season treatment beginning in July. The least effective program was one in which only late-season treatment was used.

Comparative control of overwintered boll weevils with 0.25 pound of Guthion applied at 5- or 7-day intervals was very similar. Infestations were much lower than in untreated communities, and late-season treatment was not needed until 1 month after such treatment was started in the untreated communities.

Fall treatment of four applications of methyl parathion at 0.5 pound per acre at 10-day intervals was made between September 27 and October 27 at Quebec. This treatment reduced the percentage of boll weevils in diapause to some extent, but results indicated that a shorter interval treatment would be necessary to reduce or to eliminate diapausing weevils. There were five times as many weevils in hibernation in the untreated as in the treated area, but hibernating populations were not eliminated.

In the spring of 1962, weevil populations in ground trash in the untreated community were almost four times those in the treated community. Differences in field populations were similar. Four spray applications of Guthion at 0.25 pound per acre at weekly intervals in the fall-treated community resulted in a very low weevil infestation for a 6-week period, during which a high percentage of the crop was set. Bollworm control was needed during this period.

Results of these studies indicate that fall treatment followed by early treatment in the spring would reduce weevil populations to low enough levels in the main boll weevil belt to make feasible the release of sterile males to eliminate populations.

Summary

Results of experiments conducted in 1960, 1961, and 1962 indicated that fall applications of methyl parathion were effective in reducing hibernating boll weevil populations. However, a 7-day application interval would probably be more effective than a 10-day interval. Although control of overwintered boll weevils with Guthion required a minimum of late-season treatment, the best control was obtained when fall treatment with methyl parathion was followed with Guthion for overwintered boll weevil control. This procedure would be much more effective in reducing overwintered boll weevil populations in the boll weevil belt than fall treatment or early-spring treatment alone.

U.S. DEPARTMENT OF AGRICULTURE
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USE PESTICIDES SAFELY

If you use pesticides, apply them only when needed and handle them with care. Follow the directions and heed all precautions on the container label. If pesticides are handled or applied improperly, or if unused portions are disposed of improperly, they may be injurious to humans, domestic animals, desirable plants, honey bees and other pollinating insects, fish, and wildlife, and may contaminate water supplies.